TEST PROCEDURES REGARDING FLUORESCENT LAMP BALLASTS

This document provides the DOE test procedures for measuring the energy consumption of fluorescent lamp ballasts, as contained in 10 CFR 430, Subpart B, Appendix Q.

Appendix Q to Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Fluorescent Lamp Ballasts

1. Definitions

1.1 *ANSI Standard* means a standard developed by a committee accredited by the American National Standards Institute.

1.2 *Ballast input voltage* means the rated input voltage of a fluorescent lamp ballast.

1.3 *F4OT12 lamp* means a nominal 40 watt tubular fluorescent lamp which is 48 inches in length and one and a half inches in diameter, and conforms to ANSI standard C78.81–2003 (Data Sheet 7881–ANSI–1010–1).

1.4 *F96T12 lamp* means a nominal 75 watt tubular fluorescent lamp which is 96 inches in length and one and one-half inches in diameter, and conforms to ANSI Standard C78.81–2003 (Data Sheet 7881–ANSI–3007–1).

1.5 *F96T12HO lamp* means a nominal 110 watt tubular fluorescent lamp that is 96 inches in length and 1 1/2 inches in diameter, and conforms to ANSI standard C78.81–2003 (Data Sheet 7881–ANSI–1019–1).

1.6 *F34T12 lamp* (also known as a "F40T12/ES lamp") means a nominal 34 watt tubular fluorescent lamp that is 48 inches in length and 1 1/2 inches in diameter, and conforms to ANSI standard C78.81–2003 (Data Sheet 7881–ANSI–1006–1).

1.7 *F96T12/ES lamp* means a nominal 60 watt tubular fluorescent lamp that is 96 inches in length and 1 1/2 inches in diameter, and conforms to ANSI standard C78.81–2003 (Data Sheet 7881–ANSI–3006–1).

1.8 *F96T12HO/ES lamp* means a nominal 95 watt tubular fluorescent lamp that is 96 inches in length and 1 1/2 inches in diameter, and conforms to ANSI standard C78.81–2003 (Data Sheet 7881–ANSI–1017–1).

1.9 *Input current* means the root-mean-square (RMS) current in amperes delivered to a fluorescent lamp ballast.

1.10 *Luminaire* means a complete lighting unit consisting of a fluorescent lamp or lamps, together with parts designed to distribute the light, to position and protect such lamps, and to connect such lamps to the power supply through the ballast.

1.11 *Nominal lamp watts* means the wattage at which a fluorescent lamp is designed to operate.

1.12 *Power factor* means the power input divided by the product of ballast input voltage and input current of a fluorescent lamp ballast, as measured under test conditions specified in ANSI Standard C82.2–1984.

1.13 *Power input* means the power consumption in watts of a ballast and fluorescent lamp or lamps, as determined in accordance with the test procedures specified in ANSI Standard C82.2–1984.

1.14 *Relative light output* means the light output delivered through the use of a ballast divided by the light output delivered through the use of a reference ballast, expressed as a percent, as determined in accordance with the test procedures specified in ANSI Standard C82.2–1984.

1.15 *Residential building* means a structure or portion of a structure which provides facilities or shelter for human residency, except that such term does not include any multifamily residential structure of more than three stores above grade.

1.16 *ANSI Standard C82.2–1984* means the test standard published by the American National Standard Institute (ANSI), titled "American National Standard for Fluorescent Lamp Ballasts—Method of Measurement, 1984", and designated as ANSI C82.2–1984.

2. Test conditions. The test conditions for testing fluorescent lamp ballasts shall be done in accordance with the American National Standard Institute (ANIS) Standard C82.2–1984, "American National Standard for Fluorescent Lamp Ballasts—Methods of Measurement," approved October 21, 1983. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from ANSI Publication Sales, 1430 Broadway, New York, NY 10068. Copies may be inspected at the Department of Energy, Freedom of Information Reading Room, Room 1E–190, Fluorescent Lamp Ballasts, Docket No. CE–RM–89–102, 1000 Independence Avenue, SW, Washington DC 20585, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*. Any subsequent amendment to this standard by the standard-setting organization will not affect the DOE test procedures unless and until amended by DOE. The test conditions are described in sections 4, 5, 6, 7, and 21 of ANSI Standard C82.2–1984.

3. Test Method and Measurements.

3.1. The test method for testing fluorescent lamp ballasts shall be done in accordance with ANSI Standard C82.2–1984.

3.2 *Instrumentation.* The instrumentation shall be as specified by sections 8, 9, 10, 11, 12, 19.1, and 23.2 of ANSI Standard C82.2–1984.

3.3 *Electric Supply.*

3.3.1. *Input Power.* Measure the input power (watts) to the ballast in accordance with ANSI Standard C82.2–1984, section 3.2.1(3) and section 4.

3.3.2 *Input Voltage.* Measure the input voltage (volts) (RMS) to the ballast in accordance with ANSI Standard C82.2–1984, section 3.2.1(1) and section 4.

3.3.3 *Input Current.* Measure the input current (amps) (RMS) to the ballast in accordance with ANSI Standard C82.2–1984, section 3.2.1(2) and section 4.

3.4 Light Output.

3.4.1 Measure the light output of the reference lamp with the reference ballast in accordance with ANSI Standard C82.2–1984, section 16.

3.4.2 Measure the light output of the reference lamp with the test ballast in accordance with ANSI Standard C82.2–1984, section 16.

4. Calculations.

4.1 Calculate relative light output:

$$\frac{\text{Photocell output of lamp on test ballast}}{\text{Photocell output of lamp on ref. ballast}} \times 100 = \textit{relative light output}$$

Where:

photocell output of lamp on test ballast is determined in accordance with section 3.4.2, expressed in watts, and photocell output of lamp on ref. ballast is determined in accordance with section 3.4.1, expressed in watts.

4.2. Determine the Ballast Efficacy Factor (BEF) using the following equations:

(a) Single lamp ballast

$$BEF = \frac{\text{relative light output}}{\text{input power}}$$

(b) Multiple lamp ballast

$$BEF = \frac{\text{average relative light output}}{\text{input power}}$$

Where:

input power is determined in accordance with section 3.3.1,

relative light output as defined in section 4.1, and

average relative light output is the relative light output, as defined in section 4.1, for all lamps, divided by the total number of lamps.

4.3 Determine Ballast Power Factor (PF):

$$PF = \frac{Input\ power}{\text{Input voltage} \times \text{input current}}$$

Where:

Input power is as defined in section 3.3.1,

Input voltage is determined in accordance with section 3.3.2, expressed in volts, and

Input current is determined in accordance with section 3.3.3, expressed in amps.

[54 FR 6076, Feb. 7, 1989, as amended at 56 FR 18682, April 24, 1991; 69 FR 18803, Apr. 9, 2004; 70 FR 60412, Oct. 18, 2005]